

The Living
BODY

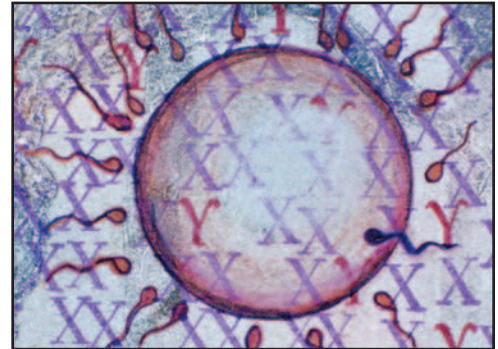
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Summary

This, the first *Living Body* program on human reproduction, explores the physical changes of puberty as the camera follows a group of young adolescents on their way to summer camp. The transition from childhood to adulthood involves a turmoil of bodily changes that affect nearly every tissue and organ. These enormous physical changes reflect the driving force behind human development: the pressure to reproduce and the need to find a sexual partner for species survival.



For the first few weeks of life in the womb, there is no obvious physical difference between females and males. The fetus has two clumps of cells that will develop into ovaries in the female and testes in the male. Until puberty, the sex organs remain largely dormant. The physical changes of adolescence begin with the release of hormones from glands in the brain. The hypothalamus and pituitary glands secrete many of the most important hormones. When a young person reaches the age of 11 or 12, the sex organs themselves produce hormones that effect many physical changes.

Some of the major events of puberty take place on the microscopic level in the ovaries and testes, where ova and sperm are produced. Nearly every cell in the body has 46 chromosomes, but sperm and ova only have 23 since they will combine at fertilization to create a new human being with 46 chromosomes.

With the onset of puberty in girls, the ovaries increase tenfold in weight and begin to produce estrogen. This hormone, in turn, increases the weight of the womb by 25 times. As estrogen is released into the bloodstream, different types of body cells are programmed to respond to it. Breasts begin to develop, hair-producing cells become active, and fat cells surrounding the hips are affected. Estrogen also influences the pelvic bones, changing their proportions. Menstruation and ovulation begin under the influence of several hormones that regulate this monthly cycle.

Puberty in males usually begins later than in females, and is triggered by the release of hormones from the brain. These secretions affect the testes, causing them to increase 30 times in weight. The testes produce sperm and secrete testosterone, a hormone that has far-reaching effects on the rest of the body. New areas of hair begin to grow, and bone growth is selectively stimulated, resulting in a longer skull and jawbone, and broader shoulders. The voice-box gets larger and the voice grows deeper. The mature testes can deliver about 200 million sperm cells a day. Sperm are produced in the several hundred tubules in each testis. Because sperm need to be produced in a cooler environment, the testes are contained in the scrotum, a sac that is mostly outside the body and therefore several degrees cooler.

Objectives

1. To describe the physical events of puberty in females and males.
2. To explain the development of secondary sex characteristics as the result of the release of particular hormones.
3. To describe the sequence of events of the menstrual cycle and ovulation.
4. To illustrate the interior structure of the testes and the process of sperm production.

Recall Questions

1. Name the two glands in the brain that produce many of the body's most important hormones.
2. Why do sperm and ova have only 23 chromosomes?
3. Name the hormones secreted by the ovaries and the testes.
4. What are some of the physical changes effected by the release of testosterone in boys during puberty?
5. Describe the physiological events involved in the menstrual cycle.
6. Explain why the testes are located mostly outside the body.

Interpretive Questions

1. Why do you think the human body produces millions more sex cells than will ever be used to create new life?
2. Why do males and females begin puberty at different ages, on average?
3. What are some of the emotional changes that accompany the physical changes in adolescence?

Vocabulary Required for Effective Viewing

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|-------------------|----------------|-------------------|----------------|
| • cervix | • hormones | • ovum | • testes |
| • chromosomes | • hypothalamus | • pituitary gland | • testosterone |
| • estrogen | • menstruation | • puberty | • womb |
| • fallopian tubes | • ovaries | • scrotum | |
| • follicle | • ovulation | • sperm | |



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